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ABSTRACT

This self-contained instructional module is designed to help adult caregivers learn how to measure arterial blood pressure in the home. The module includes the following parts: objectives; pretest (with answers); four sections of instructional material covering (1) equipment, (2) cuff placement and locating the brachial artery, (3) measuring blood pressure, and (4) reading a sphygmomanometer dial, recording blood pressure readings, and potential errors; worksheets with answers for each of the sections; and a posttest with answers. Materials are illustrated with line drawings. (KC)

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MEASURING ARTERIAL BLOOD PRESSURE
A SELF-CONTAINED
INSTRUCTIONAL MODULE

BY

CHRIS ELLEN SCHULTZ RN

APRIL 1986

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INTRODUCTION

Measuring arterial blood pressure is a simple but effective method of monitoring a person's cardiovascular status. The blood pressure is one indicator of how well the heart is pumping the blood out to the rest of the body. It is sometimes important for this to be checked at home on a regular basis, such as when special medication is being taken or when the pressure is abnormally high or low, and with some training this can be done by any adult care giver.

It is the purpose of this module to teach the adult care giver how to properly measure and record arterial blood pressure. There are no specific skills required to begin the module, but it is suggested that you obtain a blood pressure cuff and stethescope to facilitate practice of the skill after the module has been completed.

This module was designed to be self-contained, and everything needed to complete the instruction can be found within it. At the beginning of the instruction you will find a pretest that contains questions on the content of the instruction. This will help to identify areas of knowledge as well as weakness. After each section there is a worksheet with questions specific to that section, and at the end of the instruction you will find a postest on the entire content. The answers to each test and worksheet can be found directly after each one, and should be used to verify your answers. It is suggested that if, at any time, you score less than 100% on any part of the module, that part should be reviewed before continuing.

When you have completed this module you will have a good basic understanding of arterial blood pressure, but more importantly you will have gained a valuable skill that you will be able to use again and again. This instruction will take approximately one hour to complete.

OBJECTIVES

Terminal Objective
The adult care giver will identify and utilize the correct equipment and procedure to accurately measure and record arterial blood pressure. In order to achieve this objective, the following specific objectives must be attained:

1.) Given diagrams of a stethescope and blood pressure cuff, identify the parts of each without error.

2.) When asked to select from a list of functions those that apply to the stethescope and blood pressure cuff, you will do so accurately.

3.) When asked to identify the correct method of applying the blood pressure cuff, you will do so without error.

4.) Given a diagram of an arm, accurately locate the normal position of the brachial artery.

5.) When asked to describe the correct procedure for cuff inflation, you will do so without error. This must include stating the rule for maximum cuff inflation.

6.) When asked to list the steps required to measure arterial pressures, you will do so in order of performance.

7.) From memory, state the rule that applies to identifying the systolic pressure.

8.) From memory, state the rule that applies to identifying the diastolic pressure.

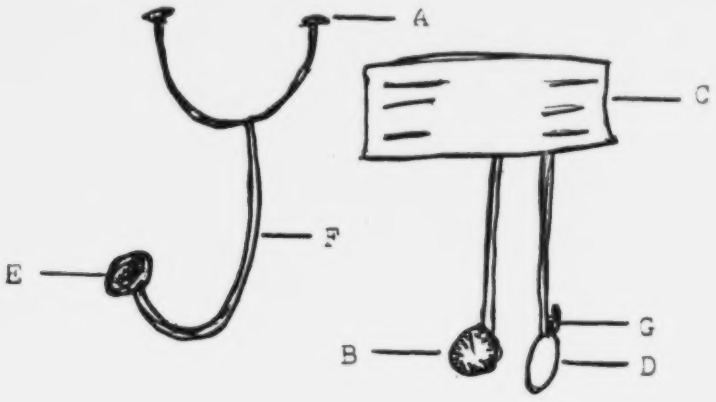
9.) Given examples of dials showing systolic and diastolic readings, interpret and record blood pressures demonstrating 100% accuracy.

10.) Describe the seven factors that can cause errors in measuring arterial pressures, as identified in this module.

Please turn the page and take the Pretest.

PRETEST

1.) Utilizing the diagram below place the appropriate letter next to the part it identifies.



_____NECK

_____SLEEVE(CUFF)

_____DIAPHRAGM

_____SPHYGMOMANOMETER DIAL

_____INFLATING BULB

_____VALVE

For numbers 2-7 decide whether the statement is true or false, then circle your choice in the column to the left of each statement.

T F 2.) The stethescope is used to locate the brachial artery.

T F 3.) The body of the stethescope is hollow to allow sound to travel from the diaphragm to the earpieces.

T F 4.) The diaphragm functions as a filter to close out extra noises and only allow pulse sounds in.

T F 5.) The blood pressure cuff constricts the vessels when inflated and stops circulation below it.

T F 6.) The dial measures the amount of pressure in the artery in millimeters of mercury.

T F 7.) The blood pressure cuff is a hollow tube of rubber that fills with air when inflated.

8.) Circle the response that identifies the correct method of cuff application.

A.) The cuff is placed loosely around the upper arm with the dial and bulb over the brachial artery.

B.) The cuff is placed tightly around the upper arm so that no pulse is felt below it, and the dial and bulb are located wherever it is easiest to locate them.

C.) The cuff is placed evenly around the upper arm with the dial and bulb placed over the inner aspect of the elbow.

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9.) Utilizing the diagram below locate the normal position of the brachial artery. Mark the location with an X.

For numbers 10 - 14 fill in the blanks with the word or phrase that accurately completes the thought.

10.)The rule for maximum cuff inflation states that the cuff should be inflated _____mm Hg past the point where the brachial pulse _____.

11.)The brachial artery is located by placing _____over the_____aspect of the elbow.

12.)The valve is rotated in a_____direction to close it before inflating the cuff.

13.)The systolic pressure is identified as the_____sound to be heard while deflating the cuff.

14.)The diastolic pressure is identified as the_____ sound to be heard while deflating the cuff.

15.) From the list of steps below choose the ones that you believe represent the correct procedure for measuring arterial pressures.

A.)Place the diaphragm lightly over the brachial artery.

B.)Release the cuff by turning the valve counterclockwise 2-3mm Hg per beat.

C.)Identify the systolic pressure.

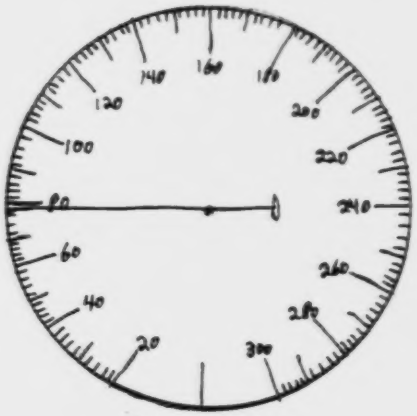
D.)Identify the diastolic pressure.

1.)A,B and C are correct
2.)A and C are correct
3.)B and D are correct
4.)only D is correct
5.)all are correct

Utilizing the diagrams below, interpret the blood pressures represented by the dials, and record your answers in the spaces provided below each set of dials.

16.)

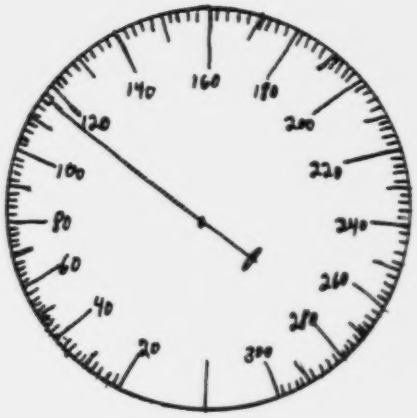
Systolic



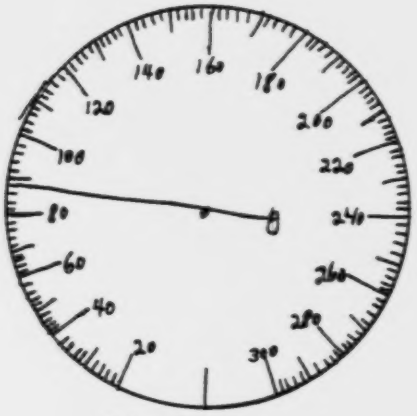
Diastolic

BP=_____

17.)



Systolic



Diastolic

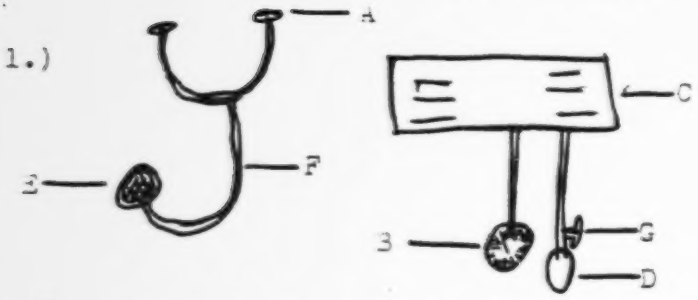
BP=_____

18.) List and discuss the seven factors which may cause an inaccurate blood pressure reading.

Please turn the page and check your answers.

PRETEST ANSWERS

1.)



F NECK
C SLEEVE(CUFF)
E DIAPHRAGM
B SPHYGMOMANOMETER DIAL
D INFLATING BULB
G VALVE

T (F) 2.) The stethescope is used to locate the brachial artery.

(T) F 3.) The body of the stethescope is hollow to allow sound to travel from the diaphragm to the earpieces.

T (F) 4.) The diaphragm functions as a filter to close out extra noises and only allow pulse sounds in.

(T) F 5.) The blood pressure cuff constricts the vessels when inflated and stops circulation below it.

(T) F 6.) The dial measures the amount of pressure in the artery in millimeters of mercury.

(T) F 7.) The blood pressure cuff is a hollow tube of rubber that fills with air when inflated.

8.) The correct method of cuff application is:

C.) The cuff is placed evenly around the upper arm with the dial and bulb placed over the inner aspect of the elbow.

9.) The normal location of the brachial artery is marked with an X below.

Please turn the page.

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10.) The rule for maximum cuff inflation states that the cuff should be inflated 20-30 mm of Hg past the point where the brachial pulse disappears.

11.) The brachial artery is located by placing two finger tips over the inner aspect of the elbow.

12.) The valve is rotated in a clockwise direction to close it before inflating the cuff.

13.) The systolic pressure is identified as the first sound to be heard while deflating the cuff.

14.) The diastolic pressure is identified as the last clear sound to be heard while deflating the cuff.

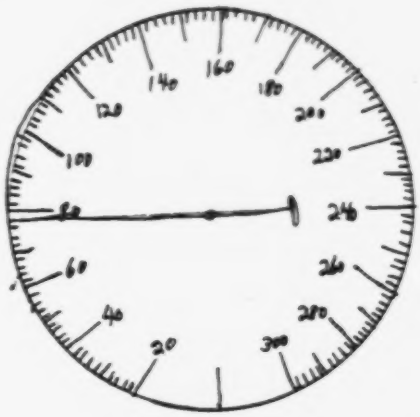
15.) The correct procedure for measuring arterial pressures consists of:

A.) Placing the diaphragm lightly over the brachial artery.
B.) Releasing the cuff by turning the valve counterclockwise 2-3mm Hg per beat.
C.) Identifying the systolic pressure.
D.) Identifying the diastolic pressure.

The correct answer is 5.) all are correct

16.)

Systolic



Diastolic

BP= 140/78

17.)

Systolic

Diastolic

BP= 116/~~88~~

Please turn the page.

18.) The seven factors which may cause an inaccurate blood pressure are:

1. The width of the cuff should cover no more than 5% of the upper arm. A cuff that is too big will result in a reading that is falsely low.
2. The cuff must be wrapped evenly around the arm, not tightly or loosely.
3. The cuff must be deflated at a rate of 2-3 mm Hg per beat to avoid excessive venous congestion.
4. The arm should rest at heart level. If it is above the heart, the reading will be falsely low.
5. The dial must be positioned at eye level so that it can be read accurately.
6. The patient should be relaxed and sitting quietly for at least 5 minutes.
7. The brachial pulse must be felt as the cuff is inflated to avoid missing the systolic pressure.

If you scored 100% on this pretest, congratulations!, you do not have to complete this module.
If, however, you scored less than 100%, please proceed to Section 1 on the next page.

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SECTION I

In order to accurately measure arterial blood pressure it is necessary that you become familiar with the equipment used in the procedure as well as its function. This section is designed to accomplish that. It may be helpful if you examine the stethescope and blood pressure cuff that you have obtained for practice as each part is described.

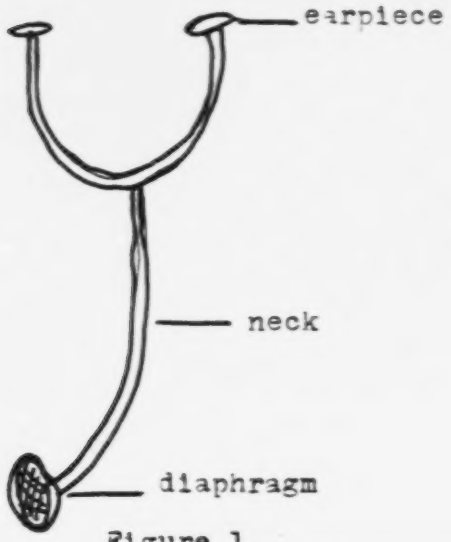

Figure 1

The stethescope is used to listen to the pulse beat during the procedure. It consists of a hollow rubber tube that divides at the top section to accomodate two earpieces. (See Figure 1) At the lower end of the neck of the stethescope is a flat metal attachment. The diaphragm is located within this piece. The diaphragm amplifies the pulse so that it can be heard clearly through the earpieces. It should be noted here that the diaphragm also amplifies all other external noises, and must be placed fully on the arm and held still to hear the pulse without interference.

The blood pressure cuff consists of a hollow rubber bladder which is usually about 6 inches wide, 24 inches long and covered with cloth. (See Figure 2) When wrapped around an arm this cuff may be snapped, secured with velcro fasteners, or tucked in to stay in place, depending on which type is used. There are two rubber tubes extending from the bladder; one has a bulb at the end, the other a gauge. The bulb is used to inflate and deflate the cuff. By turning the valve which is above the bulb clockwise, air is allowed into the bladder but not out. By turning the valve counterclockwise the air is allowed to escape. When the cuff is inflated the blood vessels in the arm are constricted. The amount of pressure being exerted is measured in millimeters of mercury (mm of Hg), which is shown on the sphygmomanometer dial, located within the gauge.

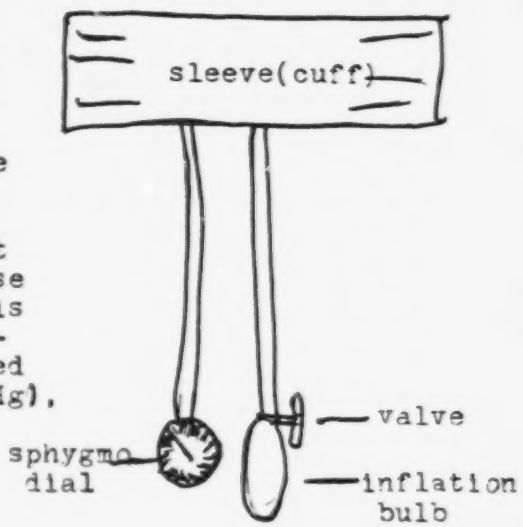

Figure 2

Please proceed to Worksheet #1 on the next page.

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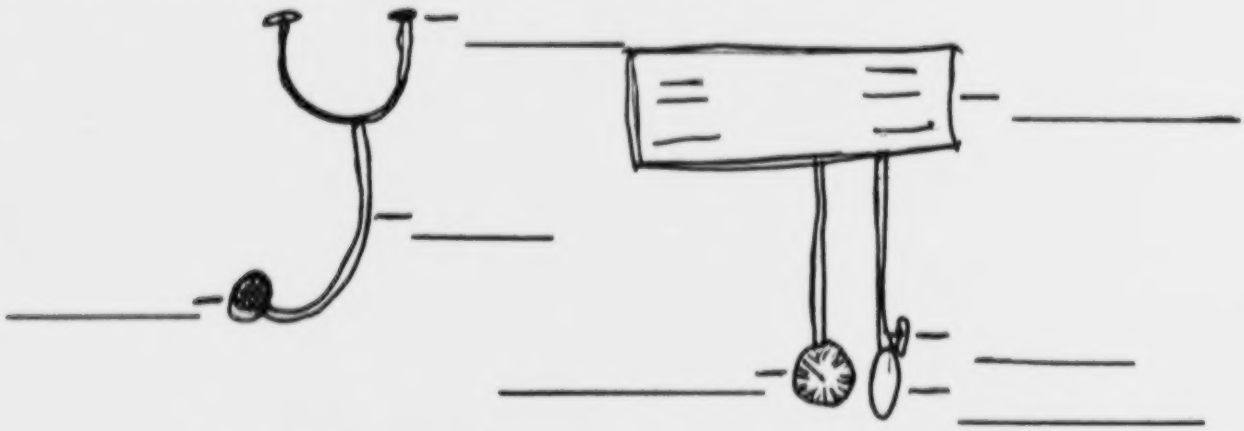
WORKSHEET #1

1.) Label the diagrams below with the appropriate name of each part.



For questions 2-5 fill in the blanks with the word or phrase that accurately completes the statement.

2.) The function of the stethescope is _____ _____.

3.) The blood pressure cuff is made of hollow _____which fills with _____when inflated and _____the blood vessels.

4.) When rotated _____the valve closes to prevent air from leaving the cuff. When rotated _____ the valve opens to allow deflation.

5.) The function of the diaphragm is to _____the pulse beat so that it can be heard through the _____.

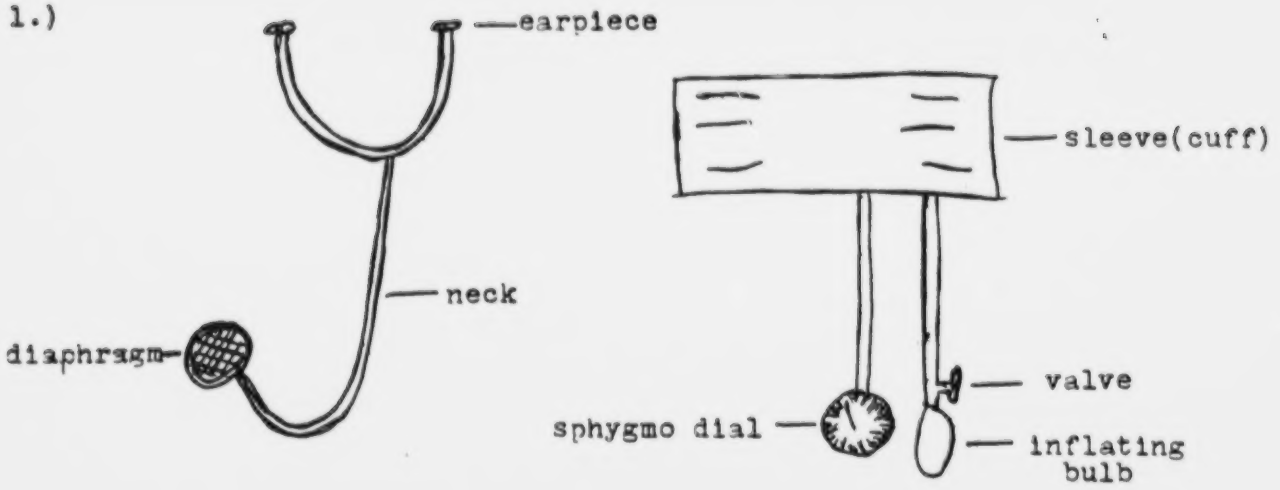
6.) Circle the one answer that correctly completes the following statement. The dial measures the blood pressure in

A.) mg of Hg
B.) mm of Hg
C.) centimeters
D.) seconds

Please turn the page and check your answers.

WORKSHEET #1 ANSWERS

1.)



2.) The function of the stethescope is <u>to listen to the pulse during the procedure</u>.

3.) The blood pressure cuff is made of hollow <u>rubber</u> which fills with <u>air</u> when inflated and <u>constricts</u> the blood vessels.

4.) When rotated <u>clockwise</u> the valve closes to prevent the air from leaving the cuff. When rotated <u>counterclockwise</u> the valve opens to allow deflation.

5.) The function of the diaphragm is to <u>amplify</u> the pulse beat so that it can be heard through the <u>earpieces</u>.

6.) The dial measures the blood pressure in millimeters of mercury (mm of Hg). The correct answer is B.

If you scored 100% on this worksheet, proceed to Section 2 on the next page.
If you did not, please review Section 1, then repeat the worksheet.

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SECTION 2

Proper cuff placement is vital to obtaining an accurate blood pressure. This section will describe how to obtain good cuff placement, and also the technique for locating the brachial artery.

This procedure can be done with the patient either lying or sitting, and either arm can be used. The arm of the patient should be positioned on the bed or chair arm so that it is resting comfortably in an outstretched position with the inner aspect of the elbow facing you. The cuff is placed so that the bottom of it is 2" above the elbow, and the tubes are directly over the inner aspect of the elbow. The cuff should then be wrapped evenly around the upper arm so that each layer is directly on top of the other. Most cuffs wrap in a clockwise fashion. The gauge should be attached to the cuff using either the clips on the gauge, or the tab attached to the cuff, depending on which type is used. This will place the dial at eye level. (See Figure 3).
A note of caution is in order here. If the cuff is applied too tightly or too loosely, the reading may be abnormally high or low. The size of the cuff must be considered here also. The width of the cuff should cover no more than 5/6 of the upper arm. If the patient is very small the size of the cuff must be reduced to obtain an accurate reading.

Figure 3

Figure 4

The brachial artery is the large artery that extends from the shoulder area to the lower arm. It is the one that is used to hear the pulse beat because it comes very close to the surface at the inner aspect of the elbow. This artery can be located by placing your first two fingertips gently on the inner aspect of the elbow slightly off center (closer to the body). Figure 4 illustrates where the normal position of the brachial artery should be. It may help to practice by locating your own brachial artery. It should be felt as an even pulsation.

Please proceed to Worksheet #2 on the next page.

WORKSHEET #2

For questions 1 - 4 fill in the blanks with the word or phrase that accurately completes the statement.

1.) The blood pressure cuff should be applied to the_____ arm _____so as to avoid an abnormally high or low reading.

2.) The blood pressure cuff should be applied_____inches above the elbow.

3.) The dial and bulb should be located over the_____aspect of the elbow when the cuff is on.

4.) The width of the cuff should cover no more than_____of the upper arm.

5.) From the diagrams below choose the one that correctly represents the normal position of the brachial artery (marked by an X). Circle the letter in front of the one you believe to be correct.

A.

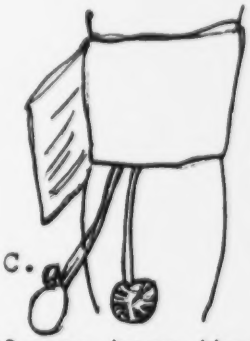
B.

C.

6.) From the diagrams below choose the one that correctly represents proper cuff placement. Circle the letter in front of the one you believe to be correct.

A.

B.

C. 

Please turn the page and check your answers.

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WORKSHEET #2 ANSWERS

1.) The blood pressure cuff should be applied to the upper arm evenly so as to avoid an abnormally high or low reading.

2.) The blood pressure cuff should be applied 2 inches above the elbow.

3.) The dial and bulb should be located over the inner aspect of the elbow when the cuff is on.

4.) The width of the cuff should cover no more than 5/6 of the upper arm.

5.) The brachial artery is located just to the inside of center on the inner aspect of the elbow, as illustrated by diagram C. below.

C.

6.) Proper cuff placement is with the two tubes located over the inner aspect of the elbow, and the gauge attached to the cuff at eye level, with the cuff 2" above the elbow. Diagram A, below, accurately illustrates this.

A.

If you scored 100% on this worksheet, proceed to Section 3.
If you did not, please review Section 2, then try the worksheet again.

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SECTION 3

Now that you know how to apply the blood pressure cuff and you can locate the brachial pulse, you are ready to learn how to measure the blood pressure.

The brachial pulse must be located first, using the first two fingertips of your nondominant hand (left if you are right-handed). After this has been identified, turn the valve clockwise until closed, using your dominant hand. While inflating the cuff by squeezing the bulb, your fingertips should remain on the pulse. When you do not feel the pulse anymore, inflate the cuff another 20-30 mm Hg. This is the rule for maximum cuff inflation, and it should not be inflated more than this. At this time the stethescope earpieces are placed in your ears, and the diaphragm over the pulse area.

The cuff pressure is then released by turning the valve counter-clockwise slowly until the first clear beat is heard. This is the systolic pressure. It represents the greatest pressure exerted by the blood during contraction of the heart; therefore it is heard first. Be sure that you note the exact numerical line on the dial where you hear the first beat.

After the systolic pressure is identified, the cuff pressure is released at a rate of 2-3 mm Hg per beat, until the last clear beat is heard. This is the diastolic pressure. It represents the lowest pressure exerted by the blood during the resting phase of the heart; therefore it is heard last. Note the number on the dial where you hear this last clear beat. All of the air should be released before removing the cuff.

To accurately measure arterial pressure it is vital that you coordinate what you <u>hear</u> through the stethescope with what you <u>see</u> on the dial.

Because this is the most vital part of measuring blood pressure, it may help to clarify the steps if they are listed in sequence.

1. Locate the brachial pulse.
2. Inflate the cuff 20-30 mm Hg beyond the point where the pulse is no longer felt.
3. Deflate the cuff slowly while listening with the stethescope.
4. Identify the systolic pressure as the first beat heard.
5. Deflate the cuff at a rate of 2-3 mm Hg per beat.
6. Identify the diastolic pressure as the last clear beat heard.

Please proceed to Worksheet #3 on the next page.

WORKSHEET #3

1.) State the rule for maximum cuff inflation.

For numbers 2-7 fill in the blanks with the word or phrase that accurately completes the statement.

2.) The valve attached to the bulb is turned_____until closed before inflation.

3.) The valve is opened by turning it_____.

4.) The cuff should be deflated at a rate of_____mm Hg per beat.

5.) Because it represents the_____pressure exerted by the blood during contraction of the heart, the systolic pressure is the_____beat heard when deflating the cuff.

6.) Because it represents the_____pressure exerted by the blood during the resting phase of the heart, the diastolic pressure is the_____beat heard when deflating the cuff.

7.) To accurately measure arterial blood pressure, what is_____ through the stethescope must be coordinated with what is_____ on the dial.

8.) Organize the list of steps below for measuring blood pressure in order of performance. Place your answers in the spaces provided that correspond to the letters in the list.

A. Locate the brachial pulse.
B. Deflate the cuff at a rate of 2-3 mm of Hg per beat.
C. Identify the systolic pressure as the first beat heard.
D. Deflate the cuff slowly while listening with the stethescope.
E. Identify the diastolic pressure as the last clear beat heard.
F. Inflate the cuff 20-30 mm Hg beyond the point where the pulse is no longer felt.

A._____
B._____
C._____
D._____
E._____
F._____

Please turn the page and check your answers.

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WORKSHEET #3 ANSWERS

1.) The rule for maximum cuff inflation states that the blood pressure cuff should be inflated 20-30 mm of Hg past the point where the brachial pulse is no longer felt.

2.) The valve attached to the bulb is turned clockwise until closed before inflation.

3.) The valve is opened by turning it counterclockwise.

4.) The cuff should be deflated at a rate of 2-3 mm Hg per beat.

5.) Because if represents the greatest pressure exerted by the blood during contraction of the heart, the systolic pressure is the first beat heard when deflating the cuff.

6.) Because it represents the lowest pressure exerted by the blood during the resting phase of the heart, the diastolic pressure is the last clear beat heard when deflating the cuff.

7.) To accurately measure arterial blood pressure, what is heard through the stethessope must be coordinated with what is seen on the dial.

8.) The correct order of performance for measuring blood pressure is as follows;
1. Locate the brachial pulse.
2. Inflate the cuff 20-30 mm Hg beyond the point where the pulse is no longer felt.
3. Deflate the cuff slowly while listening with the stethescope.
4. Identify the systolic pressure as the first beat heard.
5. Deflate the cuff at a rate of 2-3 mm Hg per beat.
6. Identify the diastolic pressure as the last clear beat heard.

The correct response is, therefore; A. 1
B. 5
C. 4
D. 3
E. 6
F. 2

If you scored 100% on this worksheet, proceed to Section 4 on the next page.
If you did not, please review Section 3, then try the worksheet again.

SECTION 4

At this point an explanation of the sphygmomanometer dial becomes important, so that you will be able to read what you see during the procedure. It is also important that you learn how to record the reading that you have obtained, either for your own record keeping, or to use when reporting to a doctor. This section will address these two points. It will also include a discussion of the potential errors that can lead to inaccurate blood pressure readings.

Systolic

Diastolic

Figure 5

The sphygmomanometer dial reads numerically from 20 - 300 mm Hg in increments of 2 mm. The needle that is centered on the dial will point to the pressure being registered during the procedure. An example of this can be seen in Figure 5. The needle is pointing at 126 in the diagram on the top, and 84 in the diagram on the bottom. Since 126 represents the first beat heard, it is the systolic pressure. 84 represents the last clear beat heard, so it is the diastolic pressure.
Blood pressure is written as a fraction, with the systolic pressure being the top number and the diastolic pressure being the bottom number. The pressure represented by Figure 5 therefore would be recorded as 126/84.

There are seven factors that need to be remembered in order to avoid getting an inaccurate blood pressure reading. Some of these have been mentioned in earlier sections, but they will be reintroduced here to emphasize their importance.

1.) The width of the cuff should cover no more than 5/6 of the upper arm. A cuff that is too big will result in a reading that is falsely low. If the patient is obese, it must be remembered that the cuff should be 20% wider than the diameter of the extremity being used. A cuff that is too small will result in a reading that is falsely high.

Please turn the page.

2.) If the cuff is wrapped too tightly or too loosely the reading will not be accurate. It must be wrapped evenly around the arm.

3.) If the cuff is deflated too slowly excessive venous congestion will occur and the reading will be falsely high. It must be deflated at a rate of 2-3 mm Hg per beat.

4.) The arm should rest at heart level. If it is above the level of the heart, the reading will be falsely low.

5.) The dial should be positioned at eye level so that it can be read accurately.

6.) The patient should be relaxed and sitting quietly for at least 5 minutes. He should not have eaten or excercised for at least 30 minutes. This will avoid a falsely high reading.

7.) If the brachial pulse is not located and felt as the cuff is inflated, the systolic pressure can be totally missed. By inflating the cuff an additional 20-3- mm Hg after the pulse is no longer felt, a falsely low reading is avoided.

Please proceed to Worksheet #4 on the next page.

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WORKSHEET #4

1.) Complete the following statement;
Blood pressure is represented by a fraction. The top number represents the_____pressure; the bottom number represents the_____pressure.

2.) From the diagrams below interpret and record the blood pressures represented on the dials. Enter your answers in the spaces provided below each set of dials.

Systolic

Diastolic

A._____

Systolic

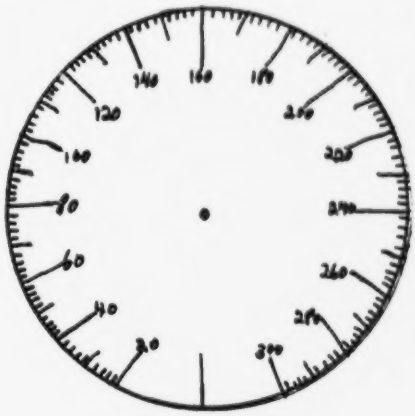
Diastolic

B._____

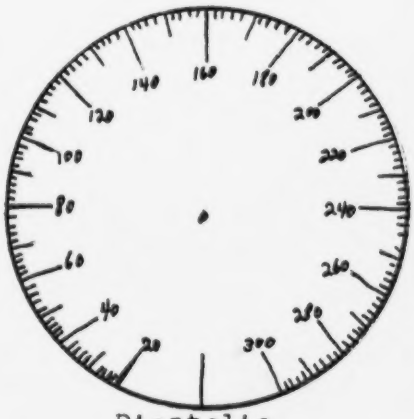
Please turn the page.

3.) Utilizing the blood pressures listed below, plot each one on the diagrams below it by drawing in the needle.

A. 120/80



Systolic



Diastolic

B. 134/76

Systolic

Diastolic

4.) To avoid getting an inaccurate blood pressure reading there are several points that must be remembered. Fill in the blanks for A-G with the word or phrase that accurately completes the statement.

A. The cuff bladder should be_____% wider than the diameter of the extremity in use. The cuff width should only cover _____of the upper arm.

B. The cuff must be wrapped_____around the upper arm.

C. The cuff must be deflated at a rate of_____mm of Hg per beat to avoid excessive venous congestion in the extremity.

Please turn the page.

D. The arm should rest at_____level during the procedure.

E. The dial must be positioned at_____level so that it can be read accurately.

F. The patient should be relaxed, sitting quietly for at least _____minutes,and not have eaten or exercized for at least_____minutes.

G. If you do not feel the brachial artery before and during cuff inflation, the reading can be inaccurate because_____ _____.

Please turn the page and check your answers.

WORKSHEET #4 ANSWERS

1.) Blood pressure is represented by a fraction. The top number represents the systolic pressure; the bottom number represents the diastolic pressure.

2.)

Systolic

Diastolic

A. 120/90

Systolic

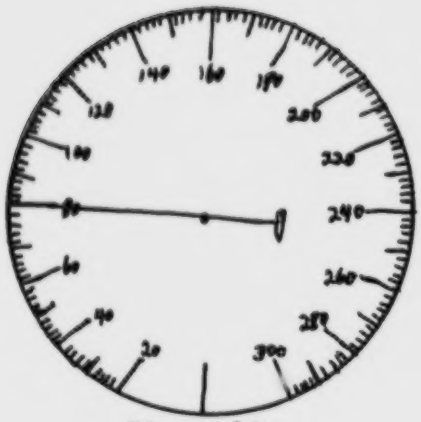
Diastolic

B. 174/110

Please turn the page.

3.) A. 120/80

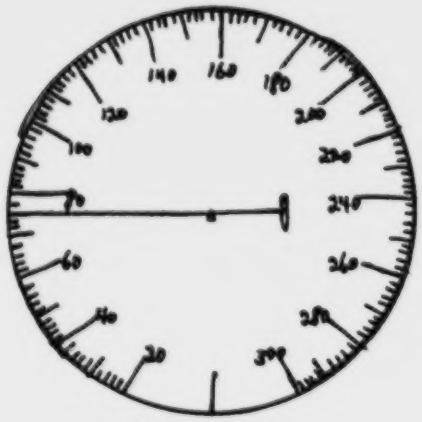
Systolic



Diastolic

B. 134/76

Systolic



Diastolic

4.) A. The cuff bladder should be 20 % wider than the diameter of the extremity in use. The cuff width should only cover 5/6 of the upper arm.

B. The cuff must be wrapped evenly around the upper arm.

C. The cuff must be deflated at a rate of 2-3 mm of Hg per beat to avoid excessive venous congestion in the extremity.

D. The arm should rest at heart level during the procedure.

Please turn the page.

E. The dial must be positioned at __eye__ level so that it can be read accurately.

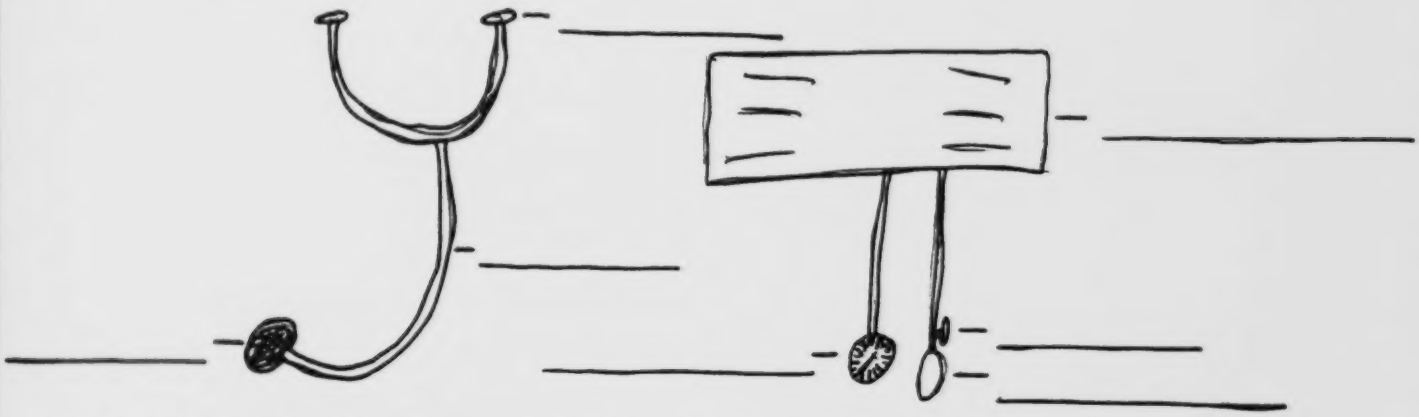
F. The patient should be relaxed, sitting quietly for at least __five__ minutes, and not have eaten or exercized for at least __thirty__ minutes.

G. If you do not feel the brachial artery before and during cuff inflation, the reading can be inaccurate because __the systolic pressure can be completely missed__.

If you scored 100% on this worksheet, proceed to the postest on the next page. If you did not, review Section 4, then try the worksheet again.

POSTEST

1.) Label the diagrams below with the appropriate names of each part.



2.) Describe the nature and function of the stethescope.

For numbers 3-7 match the terms with the words from the column at right that best describes their function.

3.) Rubber bladder
4.) Air bulb
5.) Valve
6.) Diaphragm
7.) Sphysgmo dial

A. Amplifies sound
B. Air control
C. Measures pressure
D. Constricts vessels
E. Pumps air

3._____
4._____
5._____
6._____
7._____

For numbers 8-9 fill in the blanks with the word or phrase that accurately completes the statement.

8.) The dial measures the pressure in the arteries in_____of_____.

9.) The valve controls the amount of air released or held in the cuff. It is closed by turning it_____and opened by turning it _____.

Please turn the page.

10.) Describe the correct method of cuff application.

11.) Why is it important to wrap the cuff evenly?

12.) What is the significance of placing the dial at eye level?

13.) Utilizing the diagram below locate the normal positon of the brachial artery. Mark your choice with an X.

14.) State the rule that applies to maximum cuff inflation.

15.) Describe the correct procedure for cuff inflation.

16.) List below the appropriate steps for measuring the arterial pressures in order of performance.

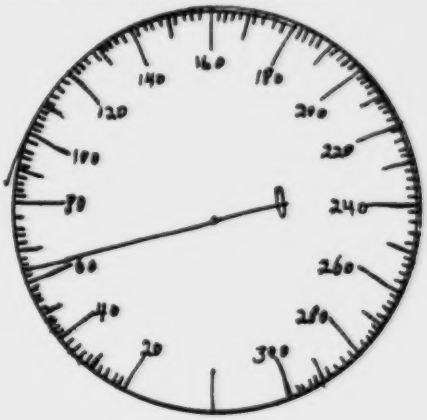
Please turn the page.

17.) State the rule that applies to identifying the systolic pressure.

18.) State the rule that applies to identifying the diastolic pressure.

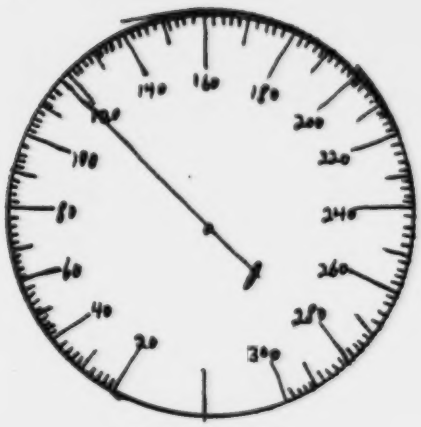
19.) Utilizing the diagrams below interpret and record the blood pressures represented on each set of dials. Record your answers in the spaces provided below each set of dials.

Systolic



Diastolic

A._____

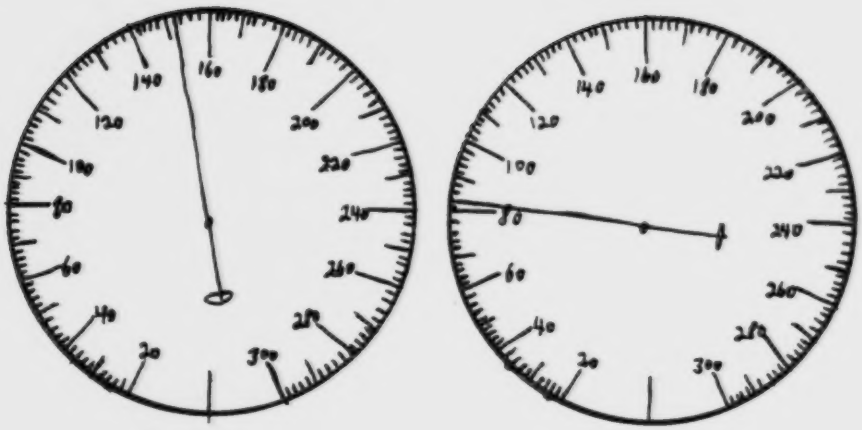


Systolic

Diastolic

B._____

Please turn the page.



Systolic Diastolic

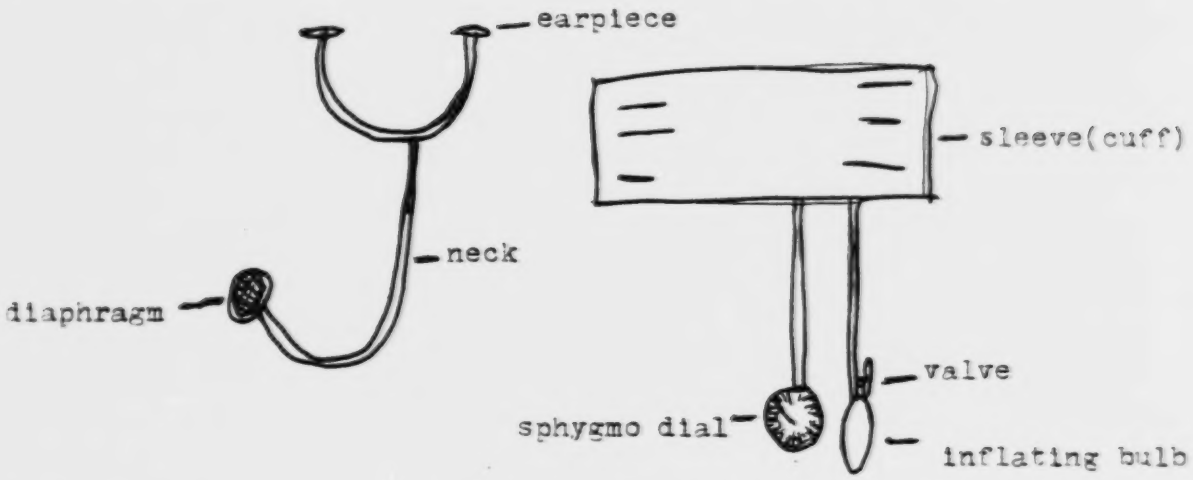
C._____

20.) Identify and discuss the seven factors that can cause inaccurate blood pressure readings.

Please turn the page.
to check your answers.

POSTEST ANSWERS

1.)



2.) The stethescope consists of a hollow rubber tube that divides at the top section to accomodate two earpieces. The diaphragm, located at the bottom of the tube, amplifies the pulse so that it can be heard through the earpieces.

3.) Rubber bladder
4.) Air bulb
5.) Valve
6.) Diaphragm
7.) Sphygmo dial

A. Amplifies sound
B. Air control
C. Measures pressure
D. Constricts vessels
E. Pumps air

3. D
4. E
5. B
6. A
7. C

8.) The dial measures the pressure in the arteries in mm of Hg.

9.) The valve controls the amount of air released or held in the cuff. It is closed by turning it clockwise and opened by turning it counterclockwise.

10.) The cuff should be applied two inches above the elbow, wrapping each layer evenly over the other. The two tubes should be positioned directly over the inner aspect of the elbow.

11.) The cuff should be wrapped evenly because when wrapped too loosely or too tightly, the reading can be falsely high or low.

12.) By placing the dial at eye level, it can be read accurately.

Please turn the page.

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13.) The normal position of the brachial artery is at the inner aspect of the elbow, just inside of center as illustrated by the diagram below.

14.) The rule that applies to maximum cuff inflation states that the cuff should be inflated 20-30mm of Hg past the point where the pulse is no longer felt.

15.) The correct procedure for cuff inflation is as follows; the brachial pulse is first located, using two fingertips of the nondominant hand. The valve is turned clockwise with the other hand, then the bulb is squeezed to inflate the cuff. When the pulse is no longer felt, the cuff is inflated 20-30mm of Hg more. The stethescope earpieces are then placed in the ears, and the diaphragm over the pulse area.

16.) The correct steps for measuring the arterial pressures are, in order of performance;

A. Locate the brachial pulse.
B. Inflate the cuff 20-30mm of Hg beyond the point where the pulse is no longer felt.
C. Deflate the cuff slowly while listening with the stethescope.
D. Identify the systolic pressure as the first beat heard.
E. Deflate the cuff at a rate of 2-3mm of Hg per beat.
F. Identify the diastolic pressure as the last clear beat heard.

17.) The systolic pressure, because it represents the greatest pressure exerted by the blood during the contraction of the heart, is identified as the first beat heard during deflation.

18.) The diasolic pressure, because it represents the lowest pressure exerted by the blood during the resting phase of the heart, is identified as the last clear beat heard during deflation.

Please turn the page.

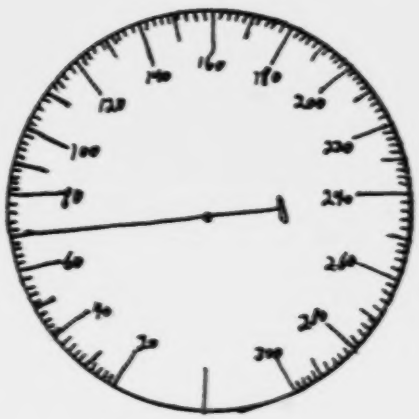
19.)

Systolic

Diastolic

A. 112/64

Systolic



Diastolic

B. 118/70

Systolic

Diastolic

C. 152/84

Please turn the page.

20.) The seven factors that can cause inaccurate blood pressure readings are as follows;

A. A cuff that is too small or too large will cause readings that are falsely high or low. The width of the cuff should cover no more than 5/6 of the upper arm. The cuff should also be 20% wider than the extremity being used.

B. If the cuff is wrapped too tightly or too loosely the reading will not be accurate. It must be wrapped evenly around the arm.

C. If the cuff is deflated too slowly excessive venous congestion will occur and the reading will be falsely high. It must be deflated at a rate of 2-3mm Hg per beat.

D. The arm should rest at heart level. If it is above the level of the heart, the reading will be falsely low.

E. The dial should be positioned at eye level so that it can be read accurately.

F. The patient should be relaxed and sitting quietly for at least five minutes. He should not have eaten or exercized for at least thirty minutes.

G. If the brachial pulse is not located and felt as the cuff is being inflated, the systolic pressure can be totally missed. By inflating the cuff an additional 20-30mm Hg after the pulse is no longer felt, a falsely low reading is avoided.

Please turn the page.

CONGRATULATIONS! You are now ready to begin taking blood pressures. This new knowledge can now be turned into a valuable skill by practicing the technique with the stethescope and blood pressure cuff that you obtained. Make sure that your instructor checks your technique, and be sure to ask him or her any questions you may have that were not dealt with in this module.

If you did not score 100% on the postest, please return to the section that you had trouble with and review it. After re-reading the section, retake the postest. If this does not help you master the area of concern, you are referred to your instructor for further clarification and review.